

FROM : E.N.O. Finance

FAX NO. : 615 726 3147

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**The Contractor:**

Eileen A. Smith, Sr. Vice President, State Operations  
Education Networks of America, Inc.  
1101 McGavock Street, Nashville, TN 37203  
615-312-6034  
313-557-0672 (FAX)

All instructions, notices, consents, demands, or other communications shall be considered effectively given as of the day of delivery; as of the date specified for overnight courier service delivery; as of three (3) business days after the date of mailing; or on the day the facsimile transmission is received mechanically by the telefax machine at the receiving location and receipt is verbally confirmed by the sender if prior to 4:30 p.m. CST. Any communication by facsimile transmission shall also be sent by United States mail on the same date of the facsimile transmission.

E.3. Subject to Funds Availability. The Contract is subject to the appropriation and availability of State and/or Federal funds. In the event that the funds are not appropriated or are otherwise unavailable, the State reserves the right to terminate the Contract upon written notice to the Contractor. Said termination shall not be deemed a breach of Contract by the State. Upon receipt of the written notice, the Contractor shall cease all work associated with the Contract. Should such an event occur, the Contractor shall be entitled to compensation for all satisfactory and authorized services completed as of the termination date. Upon such termination, the Contractor shall have no right to recover from the State any actual, general, special, incidental, consequential, or any other damages whatsoever of any description or amount.

E.4. Breach. A party shall be deemed to have materially breached the Contract if any of the following occurs:

- I) failure to materially perform in accordance with any term or provision of the Contract;
- II) partial performance of any material term or provision of the Contract;
- III) any material act prohibited or restricted by the Contract, or
- IV) material violation of any warranty.

For purposes of this contract, items I through IV shall hereinafter be referred to as a "Breach."

E.4.a. Contractor Breach— In event of a Breach by Contractor, the State shall have available the following remedies as described further herein:

E.4.a.i. Actual Damages and any other remedy available at law or equity;

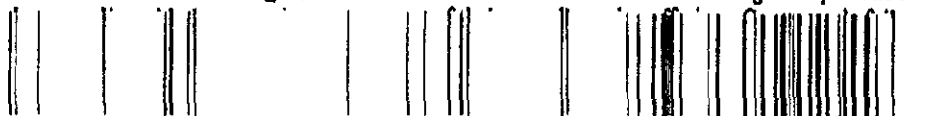
E.4.a.ii. Liquidated Damages— the State may withhold as liquidated damages the amounts designated on Attachment B of this contract from any amounts owed Contractor.

**Contract Attachment D****E-Rate Requirements**

Contract Attachment D incorporates the Contractor's responses contained in pages 3-165 through 3-175, inclusive, of the Contractor's Proposal.

**D.1 E-Rate Service Provider Compliance Requirements**

The following defines the mandatory requirements for the ConnectTEN service provider to be in compliance with the E-Rate rules and regulations as they pertain to successfully submitting a bundled ConnectTEN service offering. The ConnectTEN bundled Internet service offering must provide a solution



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- E.4.a.iv.(1) The Contractor shall be notified of the termination in writing by the State. Said notice shall hereinafter be referred to as Termination Notice.
- E.4.a.iv.(2) The Termination Notice may specify either that the termination is to be effective immediately, on a date certain in the future, or that the Contractor shall cease operations under this Contract in stages.
- E.4.a.iv.(3) Contractor agrees to cooperate with the State in the event of a termination, Partial Default or Partial Takeover.
- E.4.a.iv.(4) In the event of a termination, the State may withhold any amounts which may be due Contractor without waiver of any other remedy or damages available to the State at law or at equity.
- E.4.a.iv.(5) In the event of a termination, the Contractor shall be liable to the State for any and all damages incurred by the State and any and all expenses incurred by the State which exceed the amount the State would have paid Contractor under this Contract.
- E.4.b. State Breach— In the event of a Breach of contract by the State, the Contractor shall notify the State in writing within thirty (30) days of any Breach of contract by the State. Said notice shall contain a description of the Breach.
- E.4.b.i. Failure by the Contractor to provide the written notice described in section E.4.b. shall operate as an absolute waiver by the Contractor of the State's Breach.
- E.4.b.ii. In no event shall any Breach on the part of the State excuse the Contractor from full performance under this Contract.
- E.4.b.iii. In the event of Breach by the State, the Contractor may avail itself of any remedy at law in the forum with appropriate jurisdiction; provided, however, failure by the Contractor to give the State written notice and opportunity to cure as described in section E.4.b. operates as a waiver of the State's Breach.
- E.4.b.iv. Failure by the Contractor to file a claim before the appropriate forum in Tennessee with jurisdiction to hear such claim within one (1) year of the notice described in section E.4.b. shall operate as a waiver of said claim in its entirety. It is agreed by the parties this provision establishes a contractual period of limitations for any claim brought by the Contractor.
- E.5. Partial Takeover. The State may, at its convenience and without cause, exercise a partial takeover of any service which the Contractor is obligated to perform under this Contract, including but not limited to any service which is the subject of a subcontract between Contractor and a third party, although the Contractor is not in Breach (hereinafter referred to as "Partial Takeover"). Said Partial Takeover shall not be deemed a Breach of Contract by the State.
- E.5.a. Contractor shall be given at least thirty (30) days prior written notice of said Partial Takeover with said notice to specify the area(s) of service the State will assume and the date of said assumption.
- E.5.b. Any Partial Takeover by the State shall not alter in any way Contractor's other obligations under this Contract.
- E.5.c. The State may withhold from amounts due the Contractor the amount the Contractor would have been paid to deliver the service as determined by the State. The amounts shall be withheld effective as of the date the State assumes the service.
- E.5.d. Upon Partial Takeover, the Contractor shall have no right to recover from the State any actual, general, special, incidental, consequential, or any other damages whatsoever of any description or amount.

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- E.6. Performance Bond. Upon approval of the Contract by all appropriate State officials in accordance with applicable State laws and regulations, the Contractor shall furnish a performance bond in the amount equal to ten million dollars (\$10,000,000.00), guaranteeing full and faithful performance of all undertakings and obligations under this Contract for the initial Contract term and all extensions thereof. The bond shall be in the manner and form prescribed by the State and must be issued through a company licensed to issue such a bond in the State of Tennessee.

The Contractor shall obtain the required performance bond in form and substance acceptable to the State and provide it to the State no later than Jan 29, 2002. Failure to provide the performance bond prior to the deadline as required shall result in contract termination.

In lieu of a performance bond, an irrevocable letter of credit may be substituted as a surety deposit. The substitution of a performance bond with a surety deposit, as well as the form and substance of such a surety deposit, must be approved by the State prior to its submittal and may be rejected by the State at its sole discretion.

- E.7. State Furnished Property. The Contractor shall be responsible for the correct use, maintenance, and protection of all articles of nonexpendable, tangible, personal property furnished by the State for the Contractor's temporary use under this Contract. Upon termination of this Contract, all property furnished shall be returned to the State in as good order and condition as when received, reasonable use and wear thereof excepted. Should the property be destroyed, lost, or stolen, the Contractor shall be responsible to the State for the residual value of the property at the time of loss.

- E.8. Incorporation of Additional Documents. Included in this Contract by reference are the following documents:

- I) The Contract document and its attachments
- II) All written clarifications and addenda made to the Contractor's Proposal
- III) The Request for Proposal and its associated amendments
- IV) Technical Specifications provided to the Contractor
- V) The Contractor's Proposal

In the event of a discrepancy or ambiguity regarding the Contractor's duties, responsibilities, and performance under this Contract, these documents shall govern in order of precedence detailed above.

- E.9. Workpapers Subject to Review. The Contractor shall make all audit, accounting, or financial analysis workpapers, notes, and other documentation available for review by the Comptroller of the Treasury or his representatives, upon request, during normal working hours either while the analysis is in progress or subsequent to the completion of this Contract.

- E.10. Lobbying. The Contractor certifies, to the best of its knowledge and belief, that:

No federally appropriated funds have been paid or will be paid, by or on behalf of the Contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, and entering into any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

If any funds other than federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this contract, grant, loan, or cooperative agreement, the Contractor shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

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The Contractor shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including sub-grants, subcontracts, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients of federally appropriated funds shall certify and disclose accordingly.

- E.11. Prohibited Advertising. The Contractor shall not refer to this Contract or the Contractor's relationship with the State hereunder in commercial advertising in such a manner as to state or imply that the Contractor or the Contractor's services are endorsed, unless prior approval of the State is obtained.
- E.12. Copyrights and Patents. The Contractor agrees to indemnify and hold harmless the State of Tennessee as well as its officers, agents, and employees from and against any and all claims or suits which may be brought against the State for infringement of any laws regarding patents or copyrights which may arise from the Contractor's performance of this Contract. In any such action brought against the State, the Contractor shall satisfy and indemnify the State for the amount of any final judgment for infringement. The Contractor further agrees it shall be liable for the reasonable fees of attorneys for the State in the event such service is necessitated to enforce the terms of this Contract or otherwise enforce the obligations of the Contractor to the State. The State shall give the Contractor written notice of any such claim or suit and full right and opportunity to conduct the Contractor's own defense thereof.
- E.13. Year 2000 Hold Harmless. As required by Tennessee Code Annotated, Section 12-4-118, the contractor shall hold harmless and indemnify the State of Tennessee; its officers and employees; and any agency or political subdivision of the State for any breach of contract caused directly or indirectly by the failure of computer software or any device containing a computer processor to accurately or properly recognize, calculate, display, sort or otherwise process dates or times.
- E.14. Hold Harmless. The Contractor agrees to indemnify and hold harmless the State of Tennessee as well as its officers, agents, and employees from and against any and all claims, liabilities, losses, and causes of action which may arise, accrue, or result to any person, firm, corporation, or other entity which may be injured or damaged as a result of acts, omissions, or negligence on the part of the Contractor, its employees, or any person acting for or on its or their behalf relating to this Contract. The Contractor further agrees it shall be liable for the reasonable cost of attorneys for the State in the event such service is necessitated to enforce the terms of this Contract or otherwise enforce the obligations of the Contractor to the State.
- In the event of any such suit or claim, the Contractor shall give the State immediate notice thereof and shall provide all assistance required by the State in the State's defense. The State shall give the Contractor written notice of any such claim or suit, and the Contractor shall have full right and obligation to conduct the Contractor's own defense thereof. Nothing contained herein shall be deemed to accord to the Contractor, through its attorney(s), the right to represent the State of Tennessee in any legal matter, such rights being governed by *Tennessee Code Annotated*, Section 8-6-106.
- E.15. Tennessee Consolidated Retirement System. The Contractor acknowledges and understands that, subject to statutory exceptions contained in *Tennessee Code Annotated*, Title 8, Chapter 36, Part 8, the law governing the Tennessee Consolidated Retirement System, provides that if a retired member returns to State employment, the member's retirement allowance is suspended during the period of the employment. Accordingly and notwithstanding any provision of this Contract to the contrary, the Contractor agrees that if it is later determined that the true nature of the working relationship between the Contractor and the State under this Contract is that of "employee/employer" and not that of an independent contractor, the Contractor may be required to repay to the Tennessee Consolidated Retirement System the amount of retirement benefits the Contractor received from the Retirement System during the period of this Contract.

- E.16. Services to Local School Systems. The Contractor agrees to provide the services described in this Contract to any and all Tennessee local school systems. For additional services, the local school systems shall utilize their own contractual document, in such form and substance as may be required by their governing body; however, the contractual document shall be based on and in accordance with the service descriptions and payment rates contained in this Contract. The Contractor shall provide said services at the same level of quality as specified herein and shall invoice separately and directly each local school system for whom service is provided. The State does not guarantee that any local school systems will request services nor does the State guarantee the specific level of service, if any, that may be requested. In the course of providing these services to local school systems, a local school system may purchase additional professional services from the Contractor necessary to allow a local school system to connect to and use the Contractor's services provided under this Contract.
- E.17. Dispute Resolution. In the event of any dispute arising during the term of the Contract concerning performance of the Contract, either party shall serve notice of such dispute on the other party, and the dispute shall be decided by the Commissioner of the Department of Finance and Administration who shall reduce his decision to writing and serve a copy on the Contractor. The decision of the Commissioner of Finance and Administration shall be final and conclusive, subject to the Contractor's right to appeal such decision, in accordance with the laws of the State of Tennessee. Pending final determination of any dispute hereunder, the Contractor shall proceed diligently with the performance of the Contract and in accordance with the State's direction.
- E.18. Office Space. The State shall, at no cost to the Contractor, provide up to 1,221 square feet of office space and utilities for the Contractor to locate tier one support help desk personnel on the 9th floor of the Andrew Johnson Tower state office building in Nashville, Tennessee, effective July 1, 2002. The Contractor personnel will have 24 hours access within the framework of state building security regulations that apply to senior level state managers. Dependent upon State office space availability, additional office space on the 9th floor of the Andrew Johnson Tower state office building may be available for lease at the official state leased office rate. Other ConnectTEN Contractor support personnel and services may be located at remote sites.
- E.19. E-Rate Discount. The maximum contract liability represents the State's portion of funding for the ConnectTEN program. The Contractor will be eligible to receive increased funding by applying for FCC E-Rate discounts in accordance with FCC E-Rate Program rules and regulations. The E-Rate discounted funds due the Contractor will be adjusted to the amount of E-Rate funding actually awarded the State.
- E.20. Contractor's interface to other parties. In a network as complex as the ConnectTEN network, the devices under management responsibility of the Contractor interface to devices and communications lines which are currently managed by other third parties. The Contractor technical support personnel will take responsibility to avoid "finger pointing" situations, however, the Contractor responsibilities are limited as follows:
- E.20.a. The Contractor technical support personnel will assist a local school representative to facilitate connecting Local Area Network wiring and servers to the ConnectTEN device. Assistance must be provided for remote troubleshooting and possible identification of incompatibilities.
- E.20.b. The Contractor technical support personnel will assist State of Tennessee Office of Information Resource Network Operations Center personnel in isolating network problems between Contractor managed routers and those of the State of Tennessee network and beyond during the migration and implementation phases of this project. Assistance is provided for coordinated trouble shooting, fault detection and isolation, but not for ultimate problem resolution.
- E.20.c. The Contractor technical support personnel will be responsible directly or through subcontractors in isolating communication line problems between ConnectTEN managed devices. Responsibilities include coordinated trouble shooting, fault detection and isolation, and problem resolution.
- E.20.d. The Contractor personnel will be responsible for all equipment in isolating equipment firmware and software bugs, and will provide equipment warranty and maintenance.

- E.20.e. For Server management services, the Contractor personnel will be responsible for operation of equipment assuming existing equipment manufacturer hardware and software maintenance agreements are in effect, and provide changes as needed over the life of the contract.
- E.20.f. Notwithstanding the above limitations, it is the intention that the Contractor has the primary responsibility to manage all component parts provided by the Contractor or any Sub-Contractor on behalf of the State to maintain the viability and the integrity of the network. The Contractor will serve as the agent for the State with all sub-contractors.
- E.21. Intellectual Property Rights: Equipment, Hardware, and Software. Contractor retains all right, title, and interest in and to any software and other intellectual property that it provides to or uses on behalf of the State pursuant to this contract and the State acknowledges and agrees that the Contractor is free to use software and intellectual property in providing services to other customers. Notwithstanding any other provision or term in this Contract, the Contractor shall retain all right, title, and interest in and to any equipment and hardware it provides to and uses on behalf of the State pursuant to this Contract, other than certain property furnished by the State as described in Section E.7 of this Contract and in Section A.3.1 of the Request for Proposal.
- E.22. Help Desk and Network Management Interface. The State and Contractor personnel will communicate through a specific set of contacts. Names and phone numbers of the individuals responsible for assisting the Contractor will be provided. This list will include contacts and numbers for business day and off-hours, along with appropriate points of contact for escalation. The State agrees to supply the Contractor with any changes to this list on a periodic basis.
- E.23. Maintenance Contracts. The Contractor throughout the life of this contract is responsible for maintaining all warranties and licenses pertaining to the network hardware, software and systems used for the bundled ConnectTEN service offering as described in the RFP. This will allow the Contractor to coordinate services and maintenance directly with the manufacturers and equipment vendors on behalf of the State.
- E.24. State-Provided Software. Any software provided by the State pursuant to this contract will be licensed pursuant to the software manufacturer's standard software licensing agreement.
- E.25. Post-Contract Transition Services. Upon termination of this contract and in the event that a different vendor is awarded the subsequent contract, the State will provide ninety (90) days prior written notice to the Contractor and the Contractor agrees to provide continuing services as the State transitions itself to receive such services from the new vendor. The services required are those as defined under this contract and shall be provided on a month-to-month basis to all end-sites being served for a period not to exceed twelve (12) months. Charges for the services shall be at the Service Unit rates per Section C.3 then current at the time of contract termination.
- If the extension of the Contract necessitates additional funding beyond that which was included in the original Contract, the increase in the State's maximum liability will be effected through an amendment to the Contract.
- E.26. State Access to ConnectTEN. The Contractor will allow the State to access the ConnectTEN platform, using vendor equipment, in order to launch web-based initiatives, to include teacher professional development, on-line student testing and curriculum delivery, provided that such access neither (i) interferes with or harms the ConnectTEN platform, nor (ii) results in the Contractor incurring or bearing additional costs or expenses, unless the parties mutually agree to compensation for such additional costs or expenses.
- E.27. Letter of Agency. The State designates the Contractor as its agent to act on the State's behalf for purposes of obtaining or changing services or goods from or with service providers, telecommunications companies, or any other vendor or supplier providing services, equipment, hardware, software or other materials necessary or advisable for performing this Contract. The State will provide a letter of agency, if requested by a third party, confirming Contractor's agency status.

## Maintenance:

- Please document your plans for maintaining your equipment both old and new as well as ineligible hardware.
- Is the equipment under warranty?
- Do you have a maintenance contract?
- Do you have a maintenance staff who maintains the equipment? If so please include their salaries on the Item 25 worksheet if you have not already done so.

The Anderson County School System has a staff of 7 full time employees who care for the technology used throughout our district. The combined total for all 7 employees is approximately \$230,000 each year. The work these employees do each day is centered around our Anderson County Trouble Ticket Data Base. Employees across our district go to the Anderson County Schools website and log a trouble ticket. The Office of Technology, OOT, work from this list of trouble tickets. During the 2001-02 school year, we averaged about 100 tickets. We have 17 schools, Central Office, and Food Services that we support on a daily bases; 100 tickets average about 3-4 tickets at each location. Below is a copy of our trouble tickets as of 7/15/02.

**Total number of open problems: 73**

**Total number of problems entered today: 0**

Elementary			Middle			High		
Andersonville	4	0	Clinton	16	0	ACCTC	3	0
Briceville	1	0	Lake City	1	0	Anderson Co.	7	0
Claxton	2	0	Norris	3	0	Clinton	12	0
Dutch Valley	4	0	Norwood	6	0	Learn Center	0	0
Fairview	2	0						
Grand Oaks	2	0						
Lake City	6	0						
Norris	0	0						
Norwood	3	0						

At the time of purchase, all computers and servers are purchased with a full 3-year on-site warranty. Most of our up-to-date hardware is currently under warranty.

Anderson County also has a Technology Coreteam of teachers who help us support building level technology maintenance. Coreteam members consist of administrators, teachers, and educational assistance that work in our building. These individuals work very hard every day offering support and assistance to all our teachers in their building. We have 1 coreteam member for every 100 students in our schools. Each coreteam member receives extra training each year.

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- E.28. Limitation of Filtering Acknowledgment. The State acknowledges and understands that due to technological limitations and inherent properties of the Internet, World Wide Web, and other electronic services and technologies, the Contractor cannot guarantee that its services (i) will block or filter all inappropriate content or web pages; (ii) will not inadvertently block or filter content or web pages that should not have been blocked or filtered; or (iii) appropriately block or unblock a web site or web page that has been requested to be blocked or unblocked.

IN WITNESS WHEREOF:

EDUCATION NETWORKS OF AMERICA, INC.:

  
Albert Ganier, III, President and CEO

Date

1/15/02

DEPARTMENT OF EDUCATION:

  
Faye P. Taylor, Commissioner

Date

1/16/02

APPROVED:

DEPARTMENT OF FINANCE AND ADMINISTRATION:

  
C. Warren Neel, PhD, Commissioner

Date

COMPTROLLER OF THE TREASURY:

  
John G. Morgan, Comptroller of the Treasury

Date

**Contract Attachment A****ConnectTEN Technical Requirements**

Contract Attachment A incorporates the Contractor's responses contained in pages 3-1 through 3-160, inclusive, of the Contractor's Proposal.

**A.1 Physical Network Layout Requirements****A.1.1 Description of Physical Network Layout Requirements**

The network physical layout is the physical network's topology and overall architecture that is to be deployed throughout the State of Tennessee for the ConnectTEN network. Designing and implementing a statewide network infrastructure will require a hierarchical, network architecture and geographically dispersed physical presence to counties and service access points desired by the ConnectTEN End Sites. Although the ConnectTEN service provider can design and deploy the ConnectTEN network infrastructure in a manner consistent with internal best practices, it is envisioned that the ConnectTEN network service offering will be based on the following building blocks:

- **End Sites** – a school or a school administrative office location that requires connectivity to the ConnectTEN network
- **Points of Presence (POPs)** – a wide area network connection point and network aggregation point where multiple End Site locations are serviced by a single, geographically located POP within the ConnectTEN network
- **Network Access Points (NAPs)** – a wide area network aggregation and network switching point that inter-connects ConnectTEN's high-speed backbone trunks responsible for inter-NAP communications, regional POP connectivity to the network, and some local End Sites within close proximity of the NAP
- **WAN Links** – the point-to-point, partially-meshed, fully meshed, and ring configuration wide area network links used to inter-connect End Sites to POPs, POPs to NAPs, and NAPs to NAPs

The Proposer must design the network's physical layout in order to provide internet connectivity and functionality to the vast community of ConnectTEN End Site locations. The actual number of NAPs and POPs to be implemented throughout the state is not a defined requirement. The actual quantity and location of NAPs and POPs that are physically designed into the ConnectTEN network infrastructure will be left to the Proposer's discretion as long as the goal of providing cost effective, scalable, and bundled internet services are provided to the End User community. Design factors that the Proposer should consider include but are not limited to:

- Quantity and growth of ConnectTEN End Users and network systems for a given physical location, county, city or town
- Analysis of aggregating network traffic at specific POP and NAP locations for the new, ConnectTEN network infrastructure based on population, network traffic, and existing network aggregation points
- Flexible and scalable network bandwidth and network connectivity to ConnectTEN End User sites throughout the state
- Identifying and providing an End Site-to-ConnectTEN universal access connectivity service offering with bundled services

The physical network layout must also provide for meeting minimum performance requirements. The minimum requirements with the E-Rate funding level at 100% are as follows:

- a) For the ConnectTEN End Site device where traffic flows, there shall not be greater than 1.5% total packet loss (e.g., dropped packets) per hour at an End Site location at any time. Remedial action with prior approval from the respective ConnectTEN NOC must take place to eliminate any packet loss or dropped packets greater than 1.5% of the total packet transmission per hour to a value less than this maximum tolerance within the timeframes as specified by the Minor Outage Response Time and Time to Fix Definition.
- b) For the ConnectTEN End Site device where traffic flows, there shall not be greater than 1.5% total errored packets (e.g., bad packets) per hour at an End Site location at any time. Remedial action must take place to eliminate greater than 1.5% errored packets provided the problem is the result of a fault within the defined network management domain for each End Site type and within the timeframes as specified by the Minor Outage Response Time and Time to Fix Definition.
- c) For each End Site's default ConnectTEN Service Provider's Internet Gateway connection, there shall not be greater than 35mSec of round-trip transmission delay between a ConnectTEN End Site Device's or ConnectTEN End Site's DTE serial WAN interface and that End Site's default Internet Gateway's serial WAN interface (e.g., End Site to closest ConnectTEN Internet egress point) during normal school hours on a school day. This 35mSec round trip transmission delay, shall be calculated as an average value for each 10 minute time sample.
- d) All ConnectTEN End Site connections shall have an average bandwidth utilization value less than 75% utilization. This 75% bandwidth utilization value shall be calculated as an average value for each 10 minute time sample during the hours normal school hours on a school day. Polling and response time measurements must be conducted every 10 minutes for a total of 6 time samples per hour.  
In the event that this 75% average bandwidth utilization factor is exceeded for a given End Site connection, remedial action with prior approval by the SDE or local school system must be taken to lessen the average bandwidth utilization to acceptable performance levels. Costs associated with remedial action will be a Contractor expense.

#### A.1.2 Physical Network Layout Technical Requirements

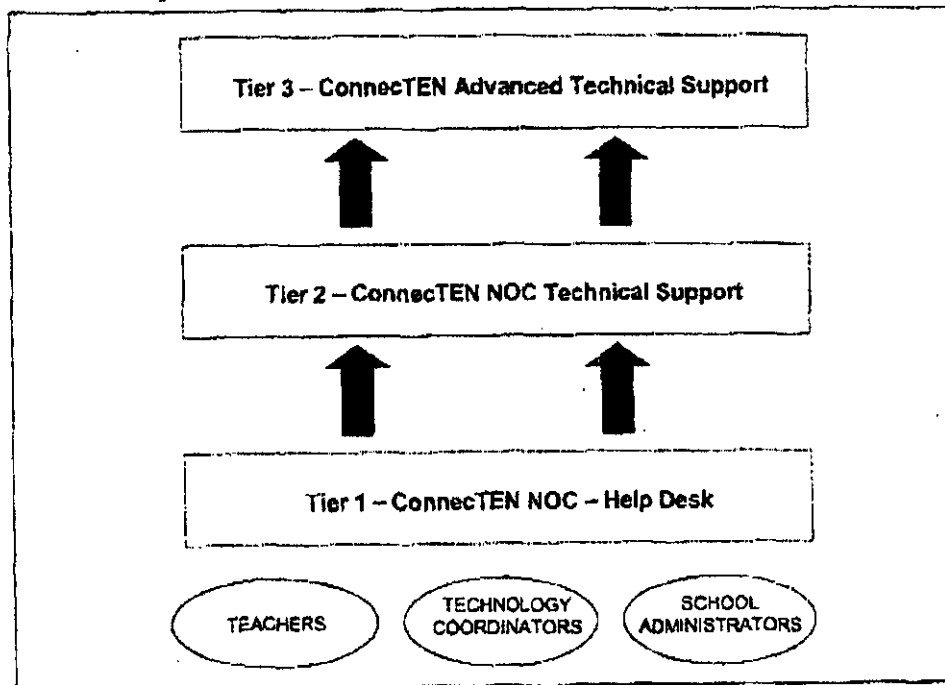
The technical requirements presented in this section define the physical network layout and topology for the ConnectTEN network.

- A.1.2.1 The ConnectTEN network infrastructure must meet minimum performance requirements defined in A.1.1.a - d above and provide internet connectivity for schools and school administrative offices with E-Rate funding level at 100%.
- A.1.2.2 The ConnectTEN network infrastructure must meet minimum performance requirements defined in A.1.1.a - d above and provide internet connectivity for schools and school administrative offices with the E-Rate funding level at 50%. The Department of Education recognizes that average bandwidth utilization could be adversely impacted at the reduced E-Rate funding level. The Proposer will define the average bandwidth utilization value that will be maintained at this E-Rate funding level. Any cost associated with maintaining the average bandwidth utilization value will be a Contractor expense.
- A.1.2.3 The ConnectTEN network infrastructure must meet minimum performance requirements defined in A.1.1.a - d above and provide internet connectivity for schools and school administrative offices with the E-Rate funding level at 0%. The Department of Education recognizes that average bandwidth utilization could be adversely impacted at the reduced E-Rate funding level. The Proposer will define the average bandwidth utilization value that will be maintained at this E-Rate funding level. Any cost associated with maintaining the average bandwidth utilization value will be a Contractor expense.

**A.2 Bundled Network Management Requirements****A.2.1 Description of the ConnectTEN Network Management Structure***Envisioned ConnectTEN Service Provider to K-12 End User Community Interfacing*

Given that each Local Education Agency will be connected and utilize the ConnectTEN network infrastructure for Internet access and E-Mail services, it is envisioned that each local school system will create their own internal methods and processes for how they would like to interface to the ConnectTEN Tier 1 Network Operations Center (NOC) Help Desk. The ConnectTEN service provider should expect and allow for any individual End User to contact the Help Desk with questions, report a fault or technical problem, or provide technical assistance as part of the overall bundled service offering. In light of this, the ConnectTEN service offering will be responsible for providing comprehensive network management support to its end user customer base and act as the direct liaison between the K-12 End User Community and the ConnectTEN Service Provider.

The ConnectTEN technical support hierarchy must be capable of providing a creative service offering specifically in these four areas: 1) fault; 2) performance; 3) configuration; and 4) security management. The ConnectTEN Level 1 NOC Help Desk will act as the single point of contact for all End User inquiries and fault notifications. In addition, the ConnectTEN NOC function will provide Tier 2 and Tier 3 technical support and interfacing with the End User for problems or faults that are not resolved by the Tier 1 NOC Help Desk. This hierarchy is depicted in the graphic below.



*Tier 1 - ConnectTEN Service Provider NOC Support Overview*

- A.2.2.8 The ConnectTEN NOC Help Desk must route inbound calls to the next Tier NOC technician or engineer in the event that all Tier 1 NOC Help Desk technicians or engineers are busy thereby minimizing the duration of calling queues.
- A.2.2.9 The ConnectTEN NOC Help Desk service offering must have an internal Quality Assurance process and checks and balance process that monitors, evaluates, and verifies if satisfactory problem resolution and service level commitments are met.
- A.2.2.10 The ConnectTEN network management service offering must provide the network management services according to the following demarcation definition: The point of demarcation for the ConnectTEN Service Provider's responsibilities is the router or data communications device that connects a school building's LAN to the ConnectTEN network.
- A.2.2.11 The ConnectTEN network management service offering must undergo an annual audit. The purpose of this annual audit is to verify and validate at a minimum the following:
- Devices to be monitored
  - ConnectTEN network growth and scalability for the next year
  - Overview of that year's compliance with the Contract service level agreements
  - Overall quality assurance and internal processes review

#### A.2.3 Fault Management Technical Requirements

The following defines the requirements for Fault Management of the ConnectTEN network.

##### *Fault Management*

##### *Purpose*

Fault Management is a process within Network Operations responsible for applying proven and consistent analytical approaches to network problem determination, isolation, and resolution. Its primary objective is to minimize network interruptions that would negatively impact service levels to the end user. Fault Management is also responsible for service recovery communications.

##### *Scope*

The Fault Management process for the ConnectTEN service offering is responsible for identifying and resolving problems which affect an End Site's connection to ConnectTEN.

##### *Elements*

Elements of Fault/Problem management include the following:

- *Network Status Supervision* - Monitoring functions performed by Network Management Platforms
- *Dynamic Trouble Tracking* - Automated trouble ticketing and problem tracking database
- *Problem Detection* - Detection of a network problem
- *Problem Determination* - Identification of the cause of a network problem
- *Problem Notification* - Notification to appropriate individuals that a network problem exists and anticipated recovery solutions

- **Backup and Reconfiguration** - The provision for alternate paths to network resources. Maintenance of backup software configurations for equipment with the ability to quickly download a working configuration
- **Reporting** - Collection and distribution of statistical fault information used for trend analysis and as a quality assurance vehicle to insure that problems are being solved

A.2.3.1 The ConnectTEN network management service offering must conform to defined problem identification and severity definitions (see chart below). The service must provide for a minimum response time and notification of expected resolution. The service must also provide a problem resolution process that specifies the maximum repair/resolution time for each severity level. The service must also incorporate escalation procedures for taking the problem from Tier 1 to Tier 2, and from Tier 2 to Tier 3.

Critical	Major	Minor
<b>Problem identification:</b> <ul style="list-style-type: none"> <li>• Trouble Ticket Generated and SDE Notified</li> <li>• Maximum Resolution Path: 4 School Hours</li> </ul>	<b>Problem identification:</b> <ul style="list-style-type: none"> <li>• Trouble Ticket Generated</li> <li>• Maximum Resolution Path: 7 School Hours</li> </ul>	<b>Problem identification:</b> <ul style="list-style-type: none"> <li>• Trouble Ticket Generated</li> <li>• Maximum Resolution Path: 14 School Hours</li> </ul>
<b>Problems Defined as Critical:</b> <ul style="list-style-type: none"> <li>- Ten-Nash E-Mail Servers or System is Down</li> <li>- ConnectTEN Primary and Secondary DNS Servers or Service is Down</li> <li>- Internet Access for the Entire ConnectTEN Network is Down</li> <li>- More Than 50% of a School System's Access is Down</li> <li>- A Security Breach Affecting ConnectTEN is Identified</li> <li>- Any Major Problem not resolved in the maximum response time</li> </ul>	<b>Problems Defined as Major:</b> <ul style="list-style-type: none"> <li>- More than 25% of a School System's Access is Down</li> <li>- Severely Degraded ConnectTEN Access and Performance from an Individual School</li> <li>- Severely Degraded Ten-Nash E-Mail System Performance</li> <li>- Severely Degraded Web Access and Performance</li> <li>- Debugging and Troubleshooting of a Security Problem</li> <li>- Any Minor Problem not resolved in the maximum response time</li> </ul>	<b>Problems Defined as Minor:</b> <ul style="list-style-type: none"> <li>- An Individual School's ConnectTEN Access is Down</li> <li>- An End User's E-Mail Account is Down</li> <li>- Degraded ConnectTEN Access and Performance from an Individual School</li> <li>- Degraded Ten-Nash E-Mail System Performance</li> <li>- Content Filtering Problem or Fault</li> <li>- Change of E-Mail Password for End User</li> <li>- Add/Move/Delete an E-Mail Account</li> <li>- Other</li> </ul>

A.2.3.2 The ConnectTEN network management service offering must have a defined reporting system to track problem volumes, patterns and trends. The following represents the minimum Fault Management monthly reports that are required:

- Call Tracking** - this is a network management summary report that tracks all trouble calls and trouble tickets that are entered into the ConnectTEN Tier 1 NOC Help Desk. These reports must be categorized and summarized based on the severity of the trouble ticket (i.e. Critical, Major, Minor)
- Problem Resolution** - this is a network management summary report that tracks all trouble calls and trouble tickets problem restoration time. These reports must be categorized and summarized based on the severity of the trouble ticket (i.e., Critical, Major, Minor)

- c) **Average Resolution Time** - this is a network management baseline report that provides the total elapsed time from the timestamp of the Opened trouble ticket to the Closure of that trouble ticket. The Restoration Time will be averaged over the entire calendar month upon which an average restoration time will be derived for each problem severity level: Critical, Major, Minor.

#### A.2.4 Performance Management Technical Requirements

The following defines the requirements for Performance Management of the ConnectTEN network.

##### *Performance Management*

###### *Purpose*

Network Capacity and Performance Management is a functional area within Network Operations focused on capturing and analyzing network component utilization data. Optimization of network capacity and performance is accomplished by adjusting parameters within the network's design constraints.

###### *Scope*

The Network Capacity and Performance Management function takes responsibility for monitoring data traffic on the ConnectTEN network infrastructure from the network's ingress and egress points. This function is also responsible for optimizing and load balancing the traffic on the network by manipulating the operating parameters of various network components.

###### *Elements*

Elements of performance management include the following:

- **Network Availability** - Ability to access internet resources
- **Network Response Time** - Round-trip time it takes the network to respond after a user enters a request from End Site (school router, etc.) to Destination device
- **Throughput** - The quantity and speed of data being transmitted in/out an End Site location to the ConnectTEN network access point
- **Utilization** - The quantity of network bandwidth that is used by an End Site location over a specific period of time
- **Analysis and Tuning** - Proactive performance monitoring and tuning of the network to optimize performance
- **Capacity Planning** - Proactive determination of future network utilization and network utilization thresholds based on new service requests or additional End Site network traffic or physical LAN connections
- **Reporting** - Customized performance reports (reports generated by the network management tool; that determine utilization, threshold, response time, availability, etc.)

To be effective, the Performance Management Function requires network performance monitoring tools for the ConnectTEN network. The Network Capacity and Performance Management Function

should deliver network performance and capacity reports which depicts data traffic movement, protocol type, volume, traffic flow, and trends specifically for all End Site types and all Internet access links.

Using the data generated from the reports and analyses, the Network Capacity and Performance Management Function should deliver network tuning parameters, traffic load balancing recommendations, and cyclical and peak traffic patterns to ensure that service levels for network performance are met.

The following defines the requirements for Performance Management of the ConnectTEN network.

- A.2.4.1 The Performance Management service offering must perform data collection from at least one SNMP Manager device in the ConnectTEN network.
- A.2.4.2 The Performance Management service offering must use management applications, tools, and utilities to conduct SNMP polling and data collection and data archiving. Data collection must be conducted 24 hours/day, 365 days/year.
- A.2.4.3 The Performance Management service offering must include working with the ConnectTEN network in conducting traffic engineering to optimize End Site performance and throughput for Internet access.
- A.2.4.4 The Performance Management service offering must be able to identify cost-effective means to increase performance to a specific End Site location.
- A.2.4.5 The Performance Management service offering must include, at a minimum, the following monthly reports:
  - a) **End Site Non-Availability** – this is a baseline network management report that provides connection down-time information on all End Sites unavailable for 4 or more hours during a 24 hour period. *End Site Non-Availability* will be based on a 10 minute sampling rate, presented on a per hour basis for a 24-hour day, and calculated based on the ratio of total connection up-time over total possible connection up-time for that 24-hour day.
  - b) **Internet Egress (ISP) Link Availability** – this is a baseline network management report that provides availability or up-time information for each ConnectTEN Internet Egress connection. *Internet Egress Link Availability* will be based on a 10 minute sampling rate, presented on a per hour basis for a 24-hour day, and calculated based on the ratio of total circuit up-time over total possible circuit up-time for that 24-hour day.
  - c) **Internet Egress Average Bandwidth Utilization** – this is a baseline network management report that provides bandwidth utilization information for each Internet Egress connection. Each *Internet Egress Average Bandwidth Utilization* will be based on a 10 minute sampling rate, presented on a per hour basis for a 24-hour day, and calculated based on the ratio of total bits per second utilized for the maximum bandwidth threshold for that Internet Egress connection.
  - d) **Internet Egress Throughput** - this is a network management baseline report that provides information on each Internet Egress connection's throughput. The *Internet Egress Throughput* report will be reported as the total number of bytes and the total number of packets that pass through each ConnectTEN Internet Access Gateway Device based on a 10 minute sampling rate, presented on a per hour basis for a 24-hour day.
  - e) **Internet Egress Packet Loss** – this is a network management baseline report that provides information on each Internet Egress connection's packet loss (e.g., dropped packets) as a percentage of total packet transmission based on a 10 minute sampling rate, presented on a per hour basis for a 24-hour day.

- A.2.4.6 The Performance Management service offering must allow for a performance validation test be conducted to validate that the minimum performance requirements (A.1.1.a-d) are being achieved. This test can be requested by the SDE or the local school system. This test will only be requested after an incident pertaining to network performance and throughput Trouble Ticket has been opened and resolved by the ConnectTEN NOC Help Desk but problems still appear to exist. A written Performance Validation Test must be provided to the SDE or local school system that has requested this test with a formal recommendation to improve or alleviate any non-compliance with the minimum acceptable performance requirements.

## A.2.5 Configuration Management Technical Requirements

The following defines the requirements for Configuration Management of the ConnectTEN network.

### *Configuration Management*

#### *Purpose*

Configuration Management is the process within Network Operations responsible for maintaining a database of technical information on all network components. This information enables NOC technicians to provide timely troubleshooting functions as well as maintain up-to-date and accurate element management for components within the ConnectTEN network.

Configuration Management gives network technicians critical information for the problem isolation, definition, and resolution processes, and assists network support analysts for design and implementation.

#### *Scope*

The Configuration Management process is responsible for maintaining a current on-line, inventory database of information on all network components.

#### *Elements*

Elements of configuration management include the following:

- *Inventory Management* - The process of tracking and maintaining all network related hardware and software components
- *Network Topology Service* - The process of maintaining a current baseline of the network topology
- *Change Management* - The process of tracking all network changes to ensure consistency including updating network documentation
- *Order Processing and Provisioning* - The process of ordering and managing the delivery of all new network related inventory
- *Directory Services* - The process of maintaining a listing of all network related services (i.e. network printing, network faxing, etc.)
- *Reporting* - The process of reporting all important network changes (i.e. changes that deviate from the standard network configuration, or that affect network performance, such as a change that would increase network utilization)

As part of the ConnectTEN Service Provider's network management service offering, a reliable and comprehensive Configuration Management service must be provided. Using a combination of network management systems, tools, information, and policies, the ConnectTEN Service Provider must be dedicated towards providing a thorough Configuration Management service. There needs to be a ConnectTEN Service Provider commitment to implement and adhere to a strict documentation process.

Configuration Management is based on the thorough, complete, and accurate collection, processing, and application of detailed information in a wide variety of categories.

- A.2.5.1 The Configuration Management service offering shall include two distinct categories:
- a) Reactive Configuration Management – shall pertain to immediate problem resolutions in the event that a fault or problem is identified pertaining to an End Site's connection and the only corrective measure to be taken involves configuration or reconfiguration of a network component
  - b) Proactive Configuration Management – shall pertain to planning for a change or an upgrade based on historical data or new functional requirements for an existing End Site. Upgrades to network and system hardware or software elements will be categorized under Proactive Configuration Management
- A.2.5.2 The Configuration Management service offering must include on-going change management as part of its function and be supplemented with an automated configuration documentation. There should be standard operating procedures for performing End Site network hardware and software maintenance, fault management, performance management, and change management. These procedures must be supported by audit trails of triggered events that are part of the life cycle of a change from submission through implementation. This means that if additional configuration, security, and accounting modifications are triggered as a result of the change, those specific modifications must have the ability to be readily traceable to the change that caused them.
- A.2.5.3 The Configuration Management service offering must incorporate hardware and software installation, network acceptance testing, and physical and logical documentation.
- A.2.5.4 The process for ordering, installing, and conducting verification testing for any new or upgraded End Site ConnectTEN connection within the specified Configuration Management procedures must not exceed 45 calendar days but preferably 30 calendar days.
- A.2.5.5 The Configuration Management service offering must include at a minimum the following monthly network management reports:
- a) ConnectTEN Configuration Change Summary Report
  - b) End Site Reactive Configuration Change Summary
  - c) End Site Proactive Configuration Change Summary (e.g., configuration changes that are pre-scheduled for the following month)
  - d) Updates or Changes to Configuration Documentation
- A.2.5.6 Any proactive or reactive service affecting configuration management request or change to be conducted by the ConnectTEN service provider must be scheduled and approved by the SDE prior to implementation and execution.
- A.2.6 Security Management Technical Requirements
- The following defines the requirements for Network and Security Administration of the ConnectTEN network.
- Security and Administration Management*

*Purpose*

The Network Security and Administration function of Network Operations must implement ConnectTEN network security policies and procedures.

*Scope*

Network Security and Administration's scope of responsibility covers the entire ConnectTEN network infrastructure.

*Elements*

Elements of Security Management include the following:

- Evaluation of Security Services
- Evaluation of Security Management Solutions
- Alarming, Logging, and Reporting
- Protection of Network Management Systems

A.2.6.1 A secure architecture must exist to protect the ConnectTEN network from network-based attacks. This security architecture must include at a minimum:

- Blocking of all inbound traffic from outside the ConnectTEN network environment from and to RFC 1918 Intranet addresses
- Blocking of all inbound traffic with source addresses of locally assigned IP addresses
- Blocking of all outbound traffic from non-locally assigned IP addresses to prevent internal users from generating IP spoofing attacks

A.2.6.2 The ConnectTEN Network Security and Administration Management service offering must include a standard security offering as part of the bundled service offering. This standard offering will include at a minimum:

- Layer 4 specific Access Control Lists (ACLs) with the ability to filter at least Layer 4 Transport Control Protocol (TCP) and User Datagram Protocol (UDP) packets. Additionally these ACLs must be capable of filtering on traffic in established TCP sessions with some mechanism of maintaining internal state of said sessions and allowing or disallowing packets that fail to meet minimum requirements of this internal state. At a minimum, this ACL must include source and destination IP address and port and the sequence numbers of each side of the TCP session
- A router-based mechanism to protect host systems from SYN flood denial of service attacks
- A router-based mechanism to protect the ConnectTEN network environment from IP directed-broadcast, "smurf", denial of service attacks

A.2.6.3 The ConnectTEN Network Security and Administration agreement service offering must be capable of recording and capturing audit trails into the ConnectTEN network for analyzing security breaches. Periodic (every 6 months) internal security audits and penetration analysis must be performed. The conclusions of these audits will be presented in summary form to the SDE with recommendations regarding the findings of these audits. The penetration analysis and security audit will be limited in scope to the ConnectTEN network infrastructure and equipment that is managed by the Proposer and should be performed by individuals not directly involved in the normal, day-to-day operations of the ConnectTEN NOC operation.

- A.2.6.4 The ConnectTEN Network Security and Administration Management team must meet with the SDE or designated project managers on a monthly basis to review security problems and future plans, and ensure that adequate security planning is being conducted as part of an on-going review process between the ConnectTEN service provider and SDE.

The required monthly reports shall include the following:

- a) Summary of security violations or intrusion attempts at specific ConnectTEN network egress points and End Site locations
- b) Summary report of intrusion or network component damage per End Site
- c) Summary report of security violations and intrusion attempts accompanied with alternative remedies and solutions to prevent similar occurrences from happening in the future

**A.3 Electronic Mail Services Technical Requirements**

The following presents the ConnectTEN electronic mail technical requirements as part of the bundled, ConnectTEN service offering.

**A.3.1 Electronic Mail Technical Requirements**

*Current Situation*

The State Department of Education currently owns an electronic mail system called Ten-Nash. This e-mail system is comprised of two, Compaq (DEC) Alphas Model Number 800 with 512Meg RAM each are housed on the 7<sup>th</sup> Floor of the Andrew Johnson Tower. These e-mail servers and 16 disks are clustered together and serve about 45,000 teacher and administrator e-mail accounts. The Ten-Nash e-mail system supports SMTP, POP3, PINE, Telnet and DNS services and must be globally accessible without restriction beyond IP protocol.

- A.3.1.1 The ConnectTEN service provider must provide the management and administrative functions of the Ten-Nash e-mail system.
- A.3.1.2 The TEN-Nash e-mail system must be available 24x7x365.

**A.4 Name Space Management Technical Requirements**

**A.4.1 Domain Name Services Overview**

The following presents the Name Space Management technical requirements for the ConnectTEN network.

- A.4.1.1 The DNS service must comply with RFC 1035 and RFC 2133.
- A.4.1.2 The DNS service must provide domain name registration and transitioning services as needed.
- A.4.1.3 The DNS service must be available 24x7x365.
- A.4.1.4 The DNS service must support primary and secondary DNS services.
- A.4.1.5 The DNS service must support domain system inverse mapping.

**A.5 Content Filtering Technical Requirements****A.5.1 World Wide Web Content Filtering Overview**

The following describes the requirements for Content Filtering that will provide the foundation to ensure that children do not have access to inappropriate content outside. The ConnectTEN service offering must provide a solution that complies with the Children's Internet Protection Act (Pub. L. 106-554), Title XVII-Children's Internet Protection.

- A.5.1.1 The content filtering service offering must support "policy-based by users/groups" capability thus allowing different "users/groups" to different content. These users/groups will be defined by the SDE on an on-going basis throughout the life of this contract as part of the Configuration Management service offering.
- A.5.1.2 The content filtering service offering must support customized block pages and filter by name/type and custom reports.
- A.5.1.3 The proposed content filtering service offering must not be susceptible to "overblocking/underblocking" during high world wide web usage periods.
- A.5.1.4 The proposed content filtering service offering must support the blocking and configuration of RFC 1918 addressing as well as RFC 1631 addressing.

**A.6 IP Address Management Technical Requirements****A.6.1 IP Address Management Overview**

The following describes the technical requirements for IP Address Management as part of the ConnectTEN service offering. The ConnectTEN service offering must provide a solution for this requirement..

*Overview*

The ConnectTEN and the State of Tennessee's public school systems use a wide range of IP addresses. The SDE currently owns four Class B IP Network Numbers: 208.182.0.0/16, 208.183.0.0/16, 66.4.0.0/16, 66.5.0.0/16. These IP addresses are used throughout the State. Some of the Schools are still utilizing IP address space owned by the State of Tennessee's Office of Information Resources (OIR) and Tennessee Board of Regents (TBR). The IP address space owned by OIR is as follows: 170.141.0.0/16, 170.142.0.0/16, 170.143.0.0/16, 207.125.0.0/16. TBR has the following IP address space: 206.23.0.0/16 and 198.146.0.0/16. These IP addresses are being returned to their respective owner and will not be utilized in the ConnectTEN network.

Over the past three years the K-12 Internet usage has grown quite extensively. The IP address space 208.182.0.0, 208.183.0.0, 66.4.0.0, and 66.5.0.0 are being advertised out the current ConnectTEN network infrastructure to the Internet. The IP address space that ConnectTEN is using that falls in the ownership of OIR and TBR are advertised out the OIR owned links to Bell.Net.

To date, the current IP Address allocation is based on the use of the following Classless-Inter Domain Routing IP address blocks:

West Tennessee (Memphis and Jackson areas):

66.5.0.0/16  
208.183.192.0/19  
208.183.224.0/20

## Middle Tennessee (Nashville area):

66.4.0.0/17  
208.182.0.0/17  
208.182.128.0/19  
208.182.182.0/23  
208.182.184.0/21  
208.183.240.0/20

## Lower East Tennessee (Chattanooga area):

208.182.160.0/20  
208.182.176.0/22  
208.182.180.0/23  
208.183.160.0/19

## East Tennessee (Knoxville and Johnson City areas):

66.4.128.0/17  
208.182.26.0/23  
208.182.28.0/23  
208.183.0.0/17  
208.183.128.0/19

The typical schema for the ConnectTEN network has been to utilize Network Address Translation (NAT) for allocation of IP addresses from service platforms maintained across the state. It is envisioned that the current IP address allocation can sustain growth for the next couple of years or longer through continued use of NAT and DHCP technologies for IP address allocation and mapping.

**A.6.2 IP Address Management Technical Requirements**

The following presents the Address Space Management requirements for the ConnectTEN network infrastructure.

- A.6.2.1 The ConnectTEN service provider must manage the available IP addresses with an overall strategy that will provide the SDE with a scalable, long-term (five years) IP addressing schema. The strategy must also include a plan to return all OIR and TBR owned IP addresses by July 1, 2002.
- A.6.2.2 The ConnectTEN network infrastructure IP routing protocol must support CIDR and route summarization.
- A.6.2.3 The ConnectTEN service provider must design and layout an IP network layer addressing plan for the entire ConnectTEN network infrastructure and all the End Sites. Where possible the existing IP addressing scheme must remain intact and all non-SDE owned IP must be returned and renumbered as part the new IP network layer addressing plan.
- A.6.2.4 The ConnectTEN service provider must develop a plan for providing and allocating sufficient IP address space for the ConnectTEN End Sites desiring Internet access using the SDE-owned Class B IP Network Numbers.
- A.6.2.5 The ConnectTEN network infrastructure must support IPv6 when the standard is fully adopted by the IETF.
- A.6.2.6 The ConnectTEN service provider must effectively manage and assign IP network layer addresses using an automated, on-line database application throughout the life of this contract and give access to SDE for future planning.
- A.6.2.7 The IP addressing schema and IP addressing database shall be managed and maintained by the ConnectTEN service provider but the information and contents of the IP addressing database shall remain the property of the SDE.

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Mar. 28 2003 11:01AM P11

**Contract Attachment B****Service Level Agreements**

Contract Attachment B incorporates the Contractor's responses contained in pages 3-161 through 3-164, inclusive, of the Contractor's Proposal. Additionally, Contract Attachment B incorporates, by reference, the Contractor's response regarding fault management reports contained in pages 3-102 through 3-109, inclusive.

It is the intent of this contract to specifically define the minimum Service Level Agreement (SLA) criteria that is required by the State Department of Education (SDE)/State of Tennessee. It is the desire of the SDE that all students in all schools have reliable access to the internet during school hours. The following specifies and defines the SLA criteria:

**B.1 ConnectTEN Fault Management**

As specified in the Technical Requirement defined in RFP Section A.2.3, the following shall define the SLA commitment for the ConnectTEN Fault Management:

The ConnectTEN Network Operations Center (NOC) must provide a resolution to all generated Trouble Tickets within the defined maximum resolution time for Minor, Major, and Critical problems. Any Minor problem not resolved within the defined maximum resolution time must then be moved into the Major problem category. Any Major problem not resolved within the defined maximum resolution time must then be moved into the Critical problem Category. All Critical problems, including those upgraded from Minor or Major to Critical, not resolved within the defined maximum resolution time will then result in penalties being assessed for not meeting required service levels.

**Conformance:** The Fault Management monthly reports defined in RFP section A.2.3.2 will be used to determine if maximum resolution times were exceeded for Critical problems. In the Problem Resolution and Average Resolution Time monthly reports, any service interruption causes or delays in resolution that are beyond the Contractor's control, such as end site power outages, end site construction, or telco outages, will be noted and will not be considered for purposes of a non-conformance penalty.

**Non-Conformance Penalty:** Failure to meet the above requirement for any ConnectTEN Critical problem shall result in a monthly credit equal to \$2,500 for each incident that exceeded the maximum response time and an additional penalty of \$1,000 per day that the problem remains unresolved.

This credit shall be issued within 15 business days after each ConnectTEN Fault Management monthly reports are reviewed and verified by both the SDE and the Contractor. The review and verification process shall be mutually scheduled between the SDE and the Contractor for each month no greater than 2 weeks after the preceding month's last day.

**Contract Attachment C  
Tennessee Schools**

**ConnectTEN Plans**

All Tennessee schools currently have Internet access. Their method of connection and degree of equipment ownership are divided into four categories labeled Standard Plan, Alternate Plan 1, 2, and 3. The description of these four plans is below. Each school on the attached list of Tennessee Schools is identified as to the plan under which it is associated.

**STANDARD PLAN (Std)**

Description: All ConnectTEN services and connectivity to the Local Education Agency (LEA, or school district) and its individual schools are provided by the ConnectTEN vendor.

**Alternate Plan 1 (Alt 1)**

Description: The LEA manages its own school site equipment and data lines. The ConnectTEN vendor will manage the LEA or county-level aggregation point equipment and connectivity to the ConnectTEN network and will provide fully managed Internet services from the aggregation point. Those Internet connectivity services include network monitoring, filtering, software maintenance and upgrades, and hardware maintenance and upgrades as described in the Pro Forma Contract Scope of Services.

**Alternate Plan 2 (Alt 2)**

Description: This is a hybrid approach to the Standard Plan sites and the Alternate Plan 1 description above. The LEA manages school site equipment and connectivity for some, but not all, sites. The ConnectTEN vendor will manage school site equipment and connectivity for the remaining sites. All traffic traverses the ConnectTEN network and receives the benefits of network monitoring, filtering, software maintenance and upgrades, and hardware maintenance and upgrades.

The best example of this is the rural Upper Cumberland counties of *Clay, Fentress, Jackson, Overton and Pickett*. These counties are part of a project called ExCEED, the Excellence in Community Education and Economic Development. Most of the schools are connected via a fiber optic network, which then connects to the ConnectTEN network. However, there are some sites which are not within the fiber ring and which receive access via telco connectivity technologies.

*Monroe County* also has a combination of fiber-connected and telco-connected sites.

**Alternate Plan 3 (Alt 3)**

Description: The LEA uses an alternate Internet service provider.

Refer to the RFP, Contract Attachment 8-C for a list of all Tennessee Public Schools.